



A mucosal Flap for Periapical Surgery

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Abstract

The function of flap is to raise the soft tissue overlying the surgical site to give the best possible view to the operator and sufficient exposure of the area to be operated on with minimal postoperative complications.

The objective of this study is to evaluate a new flap design for exposure of periapical lesion, also to compare it with other common flaps used in periapical surgery.

The study include 107 young patients apicectomized for one, two, or three anterior teeth from January 2007 to June 2008, age ranged between 18-30 years old, using special case sheet.

The flap has given good access to one, two or three apices apicectomized with less postoperative complications including pain, swelling, parasthesia of lip and wound healing.

The flap described is an alternative approach to reach the periapical area that may be used to overcome the disadvantages of other flap designs used in periapical surgery.

Keywords: lip mucosa, flap design, periapical surgery.

Introduction

Periapical surgery enhances the retention of millions of teeth which might otherwise require extraction, its primary purpose is to remove the causative agents of periradicular pathosis and to restore the periodontium to a state of biologic and functional health^{1,2}. Gaining access to the periapical surgical site is by flap, it is a section of soft tissue that is outlined by surgical incision, carries its own blood supply, it can be reflected, held in position, repositioned and then sutured to place^{3,4}. Several flap designs can be utilized to expose the periapical lesion like trapezoidal (three sided flap), semilunar, scallop (Ochsinbein Lubke flap) and triangular (two sided) flaps. The choice of flap depends on

several factors and each approach has limitations but all are designed to be sutured over undisturbed sound bone so that intact periosteum covers the bony defect. Despite care and basic surgical guidelines post surgical problems like pain, swelling, wound dehiscence, scar formation and parasthesia may occur^{5,6}.

The dentist has to decide the design of the flap keeping in mind certain factors like number of teeth involved, extent of the lesion, sulcular depth, location and size of frenum, muscle attachments, approximating anatomic structures and the width of attached gingiva. Regardless of the flap design used certain principles should be

followed while incising and reflecting the flap: ⁶

- Incision should be made with a firm continuous stroke.
- Incision should not cross underlying bony defect that existed prior to surgery, or would be produced by the surgery.
- periosteum must be reflected as an integral part of flap.
- When there are vertical incisions, they made in the concavities between bony eminences.

The objective of the study is to introduce a new flap design for periapical surgery that differ in position and shape if compared with other flap designs used in periapical surgery. Also to overcome the disadvantages of other flap designs. Some disadvantages exist with benefits of the traditionally and widely used trapezoidal flap in which the incision is made in the intrasulcular area, though it allows enhanced

Surgical access and excellent visibility but it has certain disadvantages such as⁷:

- Difficult to incise and reflect.
- Possibility of gingival recession.
- Flap approximation, wound closure, suturing and post surgical stabilization is difficult.

Also the new flap overcome the disadvantages of other common flaps like semilunar flap which has some disadvantages like:^{7,8}

- Limited access and visibility.
- crossing root eminences.
- may not include entire lesion.
- predisposing to stretching and tearing.
- healing is associated with scar formation.

The mucosal flap allows good access to the periapical pathology leaving the free and part of the attached gingiva undisturbed while allowing flap closure well away from

the bony fenestration it has been found to be successful.

Material and Methods

The study include 107 healthy patient need apicectomy (49male and 58female)using the new type of flap design which is mucosal flap for periapical surgery , the study done in a period between January 2007to June 2008, all patients included in this study were free of any systemic disease with good oral hygiene .The age of the patients ranged between 18-30 years old , special case sheet has been prepared to answer some more important questions related to this study. The former is attached to this research as appendix A. The data are collected and arranged in tables (1-4) as relevant.

Local anesthetic solution is injected to anaesthetize the area of operation; this should extend for at least two teeth mesially and distally to the involved tooth or teeth. The lip is everted and incision is done in the lip mucosa 5mm away from the labial vestibule and parallel to it for at least one tooth distance on either side of the involved tooth (figure 2) .The mucosa is separated from the orbicularis oris muscle then it reflected to approach the periosteum superior to the apex of the involved tooth, then the periosteum is cleaned and incised superior to the apical lesion in an inverted broad based semilunar manner. Hawarths periostial elevator is then used to raise the periosteum superior to the apex ,the periosteum is then freed inferiorly to expose the bone over the length of root involved in the periapical lesion leaving the attached gingiva immediately superior to the free gingiva undisturbed , the superior and inferior flaps are then reflected with key modified Austin flap retractors to give complete exposure of the

periradicular pathology , Apicectomy and curation of all pathological lesion is then performed, after treatment of the root apex and cleaning and debridement of the bony cavity, the lip mucosa is then sutured with interrupted mattress silk 3.0 sutures .

All patients instructed to start oral hygiene regime involving brushing the teeth with soft tooth brush and mouth wash with worm normal saline 12 hours postoperatively. Each patient reviewed after two days, one week, four weeks then three months and six months later for assessment of the flap. Clinical manifestations that were used for assessment of the flap were included; postoperative pain, postoperative swelling, wound dehiscence, the formation of scar tissue and parasthesia of lip as follow:

A. Degree of pain postoperatively : pain assessment was made according to the number of paracetamol tablet (500mg) taking by the patient to relief pain during the first and second postoperative days that pain reach its maximum intensity , and it registered by the patient^{9,10,11}. Pain score according to the number of analgesic (paracetamol tablets)^{9,11} are as follow:

- 0: No pain: no need for analgesic.
- 1: mild Pain: one tablet of paracetamol can relief the pain.
- 2: Moderate pain: Two tablets of paracetamol can relief the pain.
- 3: Sever pain: More than two tablets of paracetamol can relief the pain.

B. Degree of swelling at second postoperative days.¹²

- 0. No swelling.
- 1. Mild swelling: swelling of the lip only.
- 2. Moderate swelling: Swelling of the lip with obliteration of nasolabial fold.

3. Sever swelling: Swelling of the lip, Nasolabial fold with involvement of eyelid.

C. Parasthesia of the lip. The area of operation of the lip was outlined by pin prick detection and duly noted by the patient in the record^{13,14}.

D.wound dehiscence and scar formation recorded by visual inspection and detection^{13,15,16}.

Results

Table (1) shows the number of patients that their one tooth , two teeth or three teeth apicectomized .The results of the criteria that used to evaluate the clinical status of the patient on the second postoperative day are shown in table (2,3,4,5) . Table (2) illustrates postoperative pain on the second postoperative day , its obvious that out of total 107 patients underwent apicectomy 66 patients(61.6%) associated with mild pain 32patient (29.9%)with moderate pain and 9 patients (8.4%)with sever pain , as the number of teeth increased the degree of pain is also increased.

Postoperative swelling was dramatically increased as number of apicectomized tooth increased ,68 patient (63.5%) of the total was of mild swelling ,while 32 patient(29.9%) suffer from moderate swelling ,and 7 patients(6.5%) were of sever swelling (table 3).

Table (4) shows parasthesia of lip after the procedure, only 9 patients (8.5%) had lip numbness or parasthesia of the lip at first three months postoperatively, and they recover to normal sensation after that period. Also 14 patient (13%) underwent partial parasthesia of the lip at first three months postoperative, but this feeling was disappear after that time.

Table(5) identify wound healing of the lip mucosa after the operation that no wound dehiscence seen ,while scar

softening in less than 3 months was only 47 cases (44%) from the total number.

Discussion

This flap has given a good access to one, two or three apices and may be easily extended if desired as table (1) that the flap can be used for periapical surgery of more than one tooth according to the extension of periapical lesion. Access towards the coronal third of the root was achieved there by enabling curettage of extensive areas in the interdental bone.

During dissection, however, there may be slightly more hemorrhage than with other techniques because of high vascular of lip mucosa if compared with alveolar mucosa or gingiva, but bleeding is easily controlled by pressure for about two minute. Assessment of pain and swelling in the new flap design was done at second postoperative day that reach maximum intensity and degree. In this study it was found that pain and swelling were increased when the number of apicectomized teeth increased, because as the number of apicectomized tooth increased the edema and hyperemia formation is increased also¹², this is probably the result of greater vascular of the bone and alveolar mucosa. pain experience after either periodontal or oral surgery parallels analgesic consumption very closely, as pain intensity increased, it need more analgesic consumption to relief pain^{9,10}, according to previous studies, showed that semilunar incision produced more swelling and more pain intensity as a result of pressure induced by them. This is related to haematoma pressure that of attached gingival is more than lip mucosa^{7,12}. In most of the cases post-operative swelling seemed no more troublesome

and the majority was of mild while small number shows severe swelling.

Nine patient experienced complete paraesthesia of the lip and Fourteen patients experienced some degree of partial parasthesia of the lip according to the description of the patient adjacent to the area of operation on mucosal aspect by pin prick detection and duly sensation, from other previous studies this merit and unwanted sequel was not found with other types of flap designs^{13,14}, but in all cases the area had returned to normal when followed up at three months. As the marginal gingiva was left intact no migration had been noted by detection of the artificial crown root junction. Although initially the scar at the site of operation was firm and indurate, within three months the tissues had returned to normal, the scar was barely visible and appeared to have reduced in length, this is in agreement with other studies that the scar of the lip mucosa will reduced and disappear in about three months, in contrast the scar that produced as a result of incision in attached mucosa as in semilunar flap or even relaxing vertical incision of trapezoidal flap may remain for along duration that esthetically unwanted^{15,16,17}.

Finally, all flaps for apicectomy have merits and disadvantage it is often difficult to select an entirely satisfactory approach for the tooth with a post crown and an extensive periapical bone loss. This is becoming a recurrent problem as more advantage restorative dentistry is practiced. The flap described is an alternative approach which may be used to overcome the disadvantages of other flaps in mouth with extensive crown and bridge work which may be jeopardized by apical migration of the gingival (like triangular or trapezoidal flaps), also to overcome the esthetic

disadvantage as in semilunar flap that followed by scar formation^{14,17}

References

- 1- Walton RE. Principle and practice of endodontics 2nd ed ., WB saunders company, Philadelphia 1996; 401-422
- 2- Wein FS. Endodontic therapy .The mosby company ,sant Louis, 1991 ,
- 3- Peters BL, wesselink PR. Soft tissue management in endodontic surgery. Dent. Clin. North Amer 1997; 41:513-28.
- 4- Osbon DB. Postoperative complications following dentoalveolar surgery. Dent Clinic North Am 1973 ;17:483-5
- 5- Velvart P. Papilla based incision .a new approach to recession free healing of the interdental papilla after endodontic surgery .J.Int Endod . 2002; 35:453-460.
- 6- Harrison JW , Jurosky KA. Wound healing in the tissues of the periodontium , periradical surgery .I .The dissectional wound J Ended 1991 ; 17:544-552.
- 7- Kramper BJ et al .A comparative study of the wound healing of three types of flap design used in periapical surgery J Endod 1984;10:17-25
- 8- Femen AC , Michael GN. Clinical periodontology , 8th ed .W.B. Saunders 1996; 592
- 9- Quiding H, Oksala E, Happonen RP, Lentimaki K, Ojala T. The visual analog scale in multiple-dose evaluations of analgesics. J Clin Pharmacol 1981;21:424-429.
- 10- Moore A, Collins S, Carroll D, McQuay H. Paracetamol with and without codeine in acute pain: a quantitative systematic review. Pain 1997;70:193-201.
- 11- Ohnhaus E, Adler R. Methodological problems in the measurement of pain: a comparison between the verbal rating scale and the visual analogue scale. Pain 1975;1:379-384.
- 12- Holland CS. The development of a method of assessing swelling followed periapical surgery. BJ Oral surgery 1989;17:104-14
- 13- Harrison JW, Jurosky KA. Wound healing in the tissues of periodontium following periradical surgery. J Endod 1991;17:544-552.
- 14- Gutmann JL, Harrison JW . Surgcal endodontics ,1th ed Ishiyaku Euro America, Inc . St . Lonis . Tokyo, All India Publishers 1999;17:162-167.
- 15- David M N. Flap designs for gaining access to periapical lesions .oral surgery 1983;537-541 .
- 16- P. Vewart. Papilla base incision: a new approach to recession free healing of the interdental papilla after endodontic surgery. International Endodontic Journal 2002; 35:453-460.
- 17- Molven O, Halse A, Grnug B; Incomplete healing (scar tissue) after periapical surgery-radiographic finding 8-12 years after treatment. J Endod 1996; 22: 264-268.



Figure(1) Level of incision of mucosal flap

Table(1): the number of apicectomized tooth or teeth

Teeth				Total
Number of apicectomized tooth	1 (one tooth)	2 (two teeth)	3 (three teeth)	
Number of patients	56	37	14	107

Table (2): Postoperative pain on the second postoperative day

	1	2	3	Total
1-No pain	0	0	0	0
2-Mild pain	49	16	1	66(61.6%)
3-Moderate pain	7	17	8	32(29.9%)
4- Sever pain	0	4	5	9(8.4%)
Total No.	56	37	14	107

Table (3): Postoperative swelling on the second postoperative day

Number of apicectomized teeth	1	2	3	Total
1.No swelling
2-Mild swelling	42	21	5	(63.5) 68
3-Moderate swelling	12	14	6	32 (29.9)
4-Sever swelling	2	2	3	6.5 (7%)
Total number.	56	37	14	107

Table (4): Parasthesia of lip after apicectomy

	U during the first 3-months	After 3 months
Nc complete Paraesthesia	9 (8.5%)	.
Partial Paraesthesia	14 (13%)	.

Table (5): Wound healing of the mucosa after apicectomy

	Number of Patients	Total number
1- Dehiscence	.	107
2-Scar softening in <3 months	47	107